

WHAT IS CLAIMED IS:

1. A system for controlling an optical imaging system capable of providing an image of a target, the system comprising:
  - a reflector capable of reflecting light representative of the image provided by
  - 5 the optical imaging system, wherein the reflector is capable of being adjusted in at least one direction based upon movement of the image provided by the optical imaging system;
  - an optical amplifier capable of amplifying an intensity of the light reflected by the reflector with a variable gain based upon the intensity of the reflected light; and
  - 10 a tracking device capable of receiving the light from the optical amplifier such that the reflector can be driven to a position in at least one direction based upon an image of the target represented by the light received by the tracking device.
2. A system according to Claim 1 further comprising:
  - 15 a tracker controller capable of controlling the gain of the optical amplifier based upon at least one measurement of the intensity of the light received by the tracking device, wherein the tracker controller is also capable of driving the reflector to the position in at least one direction.
- 20 3. A system according to Claim 2, wherein the tracker controller is capable of controlling the gain of the optical amplifier further based upon a threshold intensity.
4. A system according to Claim 3, wherein the tracker controller is
  - 25 capable of comparing the at least one measurement of the intensity of the light received by the tracking device with the threshold intensity, and thereafter controlling the gain of the optical amplifier based upon the comparison.
5. A system according to Claim 4, wherein the tracker controller is
  - 30 capable of increasing the gain of the optical amplifier when the at least one measurement of the intensity of light is lower than the threshold intensity to thereby amplify the intensity of the light received by the tracking device such that the intensity of light is at least as high as the threshold intensity.

6. A system according to Claim 2, wherein the reflector is capable of repeatedly reflecting the light and repeatedly being adjusted, wherein the variable-gain optical amplifier is capable of repeatedly amplifying an intensity of the light reflected by the reflector, wherein the tracking device is capable of repeatedly receiving the light from the optical amplifier, and wherein the tracker controller is capable of repeatedly controlling the gain of the optical amplifier and repeatedly driving the reflector.

7. A method for controlling an optical imaging system capable of providing an image of a target, the method comprising:

reflecting, via a reflector, light representative of the image provided by the optical imaging system;

amplifying an intensity of the light reflected by the reflector with a variable gain based upon the intensity of the reflected light; and

receiving the reflected light with amplified intensity such that the reflector can be driven to a position in at least one direction based upon an image of the target represented by the reflected light with amplified intensity.

8. A method according to Claim 7 further comprising:

receiving at least one measurement of the intensity of the reflected light, and thereafter selecting the gain of the amplification based upon at least one measurement.

9. A method according to Claim 8, wherein selecting the gain comprises selecting the gain further based upon a threshold intensity.

10. A method according to Claim 9, wherein selecting the gain comprises: comparing the at least one measurement of the intensity of the reflected light with the threshold intensity, and thereafter selecting the gain based upon the comparison.

11. A method according to Claim 10, wherein amplifying the intensity comprises amplifying the intensity with an increased gain when the at least one measurement of the intensity is lower than the threshold intensity to thereby amplify

the intensity of the reflected light such that the intensity of the reflected light is at least as high as the threshold intensity.

12. A method according to Claim 8, wherein reflecting the light comprises  
5 repeatedly reflecting the light, wherein amplifying an intensity of the light comprises repeatedly amplifying an intensity of the light, and wherein receiving the reflected light comprises repeatedly receiving the reflected light.

13. A method according to Claim 7 further comprising:  
10 driving the reflector to a position in at least one direction based upon an image of the target represented by the reflected light with amplified intensity.

14. A method for accounting for a low intensity of light in a tracking system for an optical imaging system capable of providing an image of a target,  
15 wherein the tracking system includes a reflector capable of reflecting light representative of the image, and wherein the method comprises:  
receiving at least one measurement of the intensity of light reflected via a reflector of the optical imaging system;  
comparing the at least one measurement of the intensity of the reflected light  
20 with a threshold intensity; and  
selecting a gain of an optical amplifier based upon the comparison such that the optical amplifier can amplify the intensity of the reflected light with the selected gain, and thereafter the reflector of the tracking system can be driven to a position based upon an image of the target represented by the reflected light with amplified  
25 intensity.

15. A method according to Claim 14, wherein selecting the gain comprises increasing the gain when the at least one measurement of the intensity is lower than the threshold intensity such that the optical amplifier can amplify the intensity of the reflected light such that the intensity of the reflected light is at least as high as the  
30 threshold intensity.

16. A method according to Claim 14, wherein receiving at least one measurement comprises repeatedly receiving at least one measurement, wherein

comparing the at least one measurement comprises repeatedly comparing the at least one measurement, and wherein selecting a gain comprises repeatedly selecting a gain.